

CLAIMS

What is claimed is:

1. An accumulating conveyor comprising:
 - a primary cam having an outer circumferential edge defining at least one receiving portion and at least one cam surface, the primary cam being rotatable about a rotational axis aligned substantially perpendicular to a plane of the primary cam and passing through a geometric center of the primary cam;
 - a secondary cam having an outer circumferential edge defining at least one receiving portion and at least one cam surface, the secondary cam rotatable about a rotational axis aligned substantially perpendicular to a plane of the secondary cam and passing through a geometric center of the secondary cam, the secondary cam positioned relative to the primary cam such that the plane of the primary cam is substantially parallel to the plane of the secondary cam and the rotational axis of the primary cam substantially coincides with the rotational axis of the secondary cam; and
 - wherein the primary cam and the secondary cam operably rotate at the same rotational speed about their respective rotational axis.
2. The conveyor of claim 1, wherein the at least one cam surface of the primary cam is substantially aligned with the at least one receiving portion of the secondary cam along the substantially coincident rotational axis of the primary cam and the secondary cam.
3. The conveyor of claim 1, wherein the at least one cam surface of the primary cam comprises a first end positioned at a first radius and a second end positioned at a second radius, the first radius being greater than the second radius.
4. The conveyor of claim 1, wherein the at least one cam surface of the primary cam defines a convex arcuate shape.
5. The conveyor of claim 1, wherein the at least one receiving portion of the primary cam comprises a first end having a first radius and a second end

having a second radius, the first radius being less than the second radius.

6. The conveyor of claim 1, wherein the at least one receiving portion of the primary cam comprises a substantially flat surface aligned substantially parallel to and displaced away from a radius of the primary cam.

7. The conveyor of claim 1, wherein:

the at least one cam surface of the primary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the primary cam comprises a first end adjoining the second end of the at least one cam surface and a second end adjoining a first end of the at least one cam surface.

8. The conveyor of claim 1 wherein:

the at least one cam surface of the primary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the primary cam comprises a substantially flat portion aligned substantially parallel to and displaced away from a radius of the primary cam, the flat portion having a first end adjoining the first end of the at least one cam surface, a notched portion defined by an concave arcuate surface, the notched portion having a first end adjoining a second end of the flat portion and a first end adjoining the second end of the at least one cam surface.

9. The conveyor of claim 1, wherein the at least one receiving portion of the primary cam comprises a substantially flat portion aligned substantially parallel to and displaced away from a radius of the primary cam and a notched portion defined by an concave arcuate surface, wherein one end of the flat portion adjoins one end of the notched portion.

10. The conveyor of claim 1, wherein the at least one cam surface of the secondary cam comprises a first end positioned at a first radius and a second end positioned at a second radius, the first radius being greater than the second radius.

11. The conveyor of claim 1, wherein the at least one cam surface of the secondary cam defines a convex arcuate shape.

12. The conveyor of claim 1, wherein the at least one receiving portion of the secondary cam comprises a first end having a first radius and a second end having a second radius, the first radius being less than the second radius.

13. The conveyor of claim 12, wherein the at least one receiving portion of the secondary cam comprises a substantially flat surface that is inclined relative to a radius of the secondary cam.

14. The conveyor of claim 1, wherein:

the at least one cam surface of the secondary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the secondary cam comprises a first end adjoining the second end of the at least one cam surface and a second end adjoining a first end of the at least one cam surface.

15. The conveyor of claim 1, wherein the at least one cam surface of the secondary cam has a variable radius.

16. The conveyor of claim 1, wherein the at least one receiving portion of the secondary cam comprises a substantially flat portion inclined relative to a radius of the secondary cam and a concave arcuate portion adjoining one end of the flat portion.

17. The conveyor of claim 1 wherein:

the at least one cam surface of the secondary cam comprises a first end positioned at a first radius and a second end positioned at a second radius, wherein an edge surface bounded by the first and second ends defines a convex arcuate shape; and

the at least one receiving portion of the secondary cam comprises a substantially flat portion having a first end adjoining the second end of the at least one cam surface and a second end positioned at a radius less than the first and second radii of the at least one cam surface, and a concave arcuate portion having a first end adjoining the second end of the flat portion and a second end adjoining the first end of the at least one cam surface.

18. The conveyor of claim 1, further comprising:

a first shoe having a cam follower operably engageable with the outer circumferential edge of the primary cam; and

a second shoe having a cam follower operably engageable with the outer circumferential edge of the secondary cam.

19. The conveyor of claim 18, further comprising a plate member having one end releaseably attached to the first shoe and a second end releaseably attached to the second shoe.

21. The conveyor of claim 1, further comprising:

a first sprocket affixed to the primary cam such that a rotational axis of the first sprocket is substantially aligned with the rotational axis of the primary cam;

a second sprocket affixed to the secondary cam such that the rotational axis of the first sprocket is substantially aligned with the rotational axis of the secondary cam;

a shaft having a first end engageable with the first sprocket and a second end engageable with the second sprocket, wherein at least one of the first sprocket and second sprocket is fixedly attached to the shaft for concurrent rotation therewith; and

means for operably rotating the shaft.

22. An accumulating conveyor system comprising:

- a first shaft having a first end and a second end;
- a second shaft having a first end and a second end, a longitudinal axis of the second shaft being aligned substantially parallel to a longitudinal axis of the first shaft;
- a first primary cam having an outer circumferential edge defining at least one receiving portion and at least one cam surface, the first primary cam engageable with the first end of the first shaft;
- a first secondary cam having outer circumferential edge defining at least one receiving portion and at least one cam surface, the first secondary cam engageable with a second end of the first shaft;
- a second secondary cam having outer circumferential edge defining at least one receiving portion and at least one cam surface, the second secondary cam engageable with a first end of the second shaft;
- a second primary cam having outer circumferential edge defining at least one receiving portion and at least one cam surface, the second secondary cam engageable with a second end of the second shaft;
- a first shoe having a cam follower operably engageable with the outer circumferential edge of the first primary cam and the outer circumferential edge of the second secondary cam; and
- a second shoe having a cam follower operably engageable with the outer circumferential edge of the first secondary cam follower and the outer circumferential edge of the second primary cam.

23. The conveyor system of claim 22, further comprising:

- a first sprocket fixedly attached to the first primary cam and fixedly attached to the first shaft for concurrent rotation therewith;
- a second sprocket fixedly attached to the first secondary cam and fixedly attached to the first shaft for concurrent rotation therewith;
- a third sprocket fixedly attached to the second secondary cam and rotatably connected to the second shaft; and

a fourth sprocket fixedly attached to the second primary cam and fixedly attached to the second shaft.

24. The conveyor of claim 22, further comprising means for operably rotating the first and second shafts.

25. The conveyor of claim 22, further comprising a plate member having one end releaseably attached to the first shoe and a second end releaseably attached to the second shoe.

26. The conveyor of claim 22, wherein:

the at least one cam surface of the first primary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the first primary cam comprises a first end adjoining the second end of the at least one cam surface and a second end adjoining a first end of the at least one cam surface, the first and second ends of the receiving portion delineating a substantially flat surface aligned substantially parallel to and displaced away from a radius of the primary cam.

27. The conveyor of claim 22 wherein:

the at least one cam surface of the first secondary cam comprises a first end positioned at a first radius and a second end positioned at a second radius, wherein an edge surface bounded by the first and second ends defines a convex arcuate shape; and

the at least one receiving portion of the first secondary cam comprises a substantially flat portion having a first end adjoining a second end of the at least one cam surface and a second end positioned at a radius less than the first and second radii of the at least one cam surface, and a concave arcuate portion having a first end adjoining the second end of the flat portion and a second end adjoining the first end of the at least one cam surface.

28. The conveyor of claim 22 wherein:

the at least one cam surface of the second primary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the second primary cam comprises a substantially flat portion aligned substantially parallel to and displaced away from a radius of the primary cam, the flat portion having a first end adjoining the first end of the at least one cam surface, a notched portion defined by an concave arcuate surface, the notched portion having a first end adjoining a second end of the flat portion and a first end adjoining the second end of the at least one cam surface.

29. The conveyor of claim 22, wherein:

the at least one cam surface of the second secondary cam comprises a first end having a first radius and a second end having a second radius, the first radius being greater than the second radius; and

the at least one receiving portion of the second secondary cam comprises a first end adjoining the second end of the at least one cam surface and a second end adjoining a first end of the at least one cam surface, the first and second ends of the receiving portion delineating a substantially flat portion that is inclined relative to a radius of the secondary cam..

30. The conveyor of claim 22, further comprising:

a chain meshedly engageable with the second and fourth sprockets for operably rotating the second shaft at substantially the same angular rotational velocity as the first shaft.

31. The conveyor of claim 22, wherein the first primary cam, the first secondary cam, and the second primary cam, each operably rotate at substantially the same angular rotational velocity.